

Altering the Function of Commands Presented to Boys with Oppositional and Hyperactive Behavior

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Mentalistic and behavioral analyses of noncompliance among children with hyperactive behavior are contrasted. Then, a behavioral training program for 3 boys with behavior characteristic of attention deficit hyperactivity disorder and oppositional defiant disorder is described. The child-focused training was conducted in conjunction with parent training. In an effort to increase the rate of compliance, the child-training program was designed to alter the function of parent commands by teaching the boys to verbalize rules about parent commands and consequences in the context of observing parent–child role-plays. Training was conducted within a multiple baseline design across children. Direct observation of mother–child interactions, telephone interviews, and standardized rating scales showed that training resulted in clinically significant reductions in noncompliance and improved parenting behavior. A 6-month follow-up revealed stable outcomes.

Direct observation research shows that children with behavior characteristic of attention deficit hyperactivity disorder (ADHD; American Psychiatric Association, 1994) comply with parent instructions far less consistently than do typical children (Danforth, Barkley, & Stokes, 1991). Mentalistic and behavioral analyses of noncompliance among children with hyperactivity provide disparate views and are contrasted below. Then a behavior-analytic treatment program, designed to alter the function of parent commands and increase compliant behavior, is illustrated in a preliminary study.

The selection of compliance as a target behavior is clinically significant. Psychometric research and functional analyses have identified child noncompliance with adult commands as a fundamental element of disruptive behav-

ior patterns (e.g., Achenbach, 1991; Patterson, 1986; Wahler, 1975). Furthermore, when children with ADHD disobey to a degree that warrants an additional characterization as oppositional defiant disorder (ODD; American Psychiatric Association, 1994), their prognosis includes greater aggression, active defiance, peer problems, academic underachievement, and family disturbance than that for children with ADHD who do not exhibit the behaviors characteristic of ODD (Gomez & Sanson, 1994; Kuhne, Schachar, & Tannock, 1997). Children with cooccurring ADHD and ODD have a distinctive pattern of dysfunction dissimilar to children with ADHD only and children with ODD only (Hinshaw, 1994).

Mentalistic Analyses of the Role of Self-Rules in Noncompliance

Barkley (1997) and Douglas (1999) emphasize neurobiological deficits to account for core behavioral characteristics of children with ADHD. Their analyses attribute high rates of noncompliance among these children to the failure of self-speech or self-awareness to influence overt behavior. Both

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analyses conclude that cognitive strategies that focus on self-directed speech should fail to increase the rate of compliance among children with hyperactivity, but neither approach is consistent with a behavior-analytic perspective.

Barkley (1997) proposes that an essential behavioral deficit is the failure of children with hyperactivity to use private speech to regulate their behavior. Influenced by Vygotsky (1962), Luria (1961), and Skinner (1953), Barkley postulates that during the development of typical children, the influence of language over behavior occurs in three stages: (a) the control of language by others, (b) the progressive control of behavior by self-directed and subsequently private speech conditioned by the verbal community, and (c) the creation of new rules by the child, which come about through self-directed questions. Barkley writes that children with ADHD have impairments in behavioral inhibition that adversely affect executive function. This impairment leads to delays in the development of rule-governed behavior, including self-speech. Furthermore, Barkley (1997, 1998a) contends that even if self-speech precedes behavior, such speech has less stimulus control over the motor behavior of children with ADHD than it does for typical children. This is because a primary neurobiological deficit in behavioral inhibition precludes effective control by self-stated verbal rules. Specifically, "The control of motor action by verbal thought is weakened by the deficiency in inhibition characterizing ADHD, such that knowing what to do is not so much the problem as doing what one knows" (Barkley, 1997, p. 245).

In an effort to identify the core dysfunction responsible for ADHD, Douglas (1999) favors a cognitive model that integrates Barkley's (1997) ideas about deficits in response inhibition with a focus on attention deficits during stimulus processing. Douglas presents a model in which children are unable to allocate sufficient effort to cog-

nitive processing. For example, when options are presented, the "children do not take sufficient time to search carefully through the alternatives and, consequently, make more errors" (p. 126). Douglas suggests deficiencies in the child that include allocating effort and attention to cognitive behavior. This, in turn, explains why cognitive therapy that emphasizes teaching problem-solving strategies to improve noncompliance among children with ADHD has shown disappointing results: "Evidence that ADHD children frequently fail to apply strategies with which they are familiar and which they understand are more effective underlines the central role of basic control processes" (p. 31).

Cognitive therapy interventions have been designed to increase the rate of compliance among children with defiant and hyperactive behavior. The cognitive interventions focus on enhancing self-directed private speech that, in turn, is supposed to have a positive influence on following directions. Consistent with what Barkley's (1997) and Douglas' (1999) analyses would predict, there is ample evidence disputing the efficacy of cognitive therapy to increase compliance among children with hyperactivity (DuPaul & Stoner, 1994; Pelham, Wheeler, & Chronis, 1998).

Barkley's (1997) and Douglas' (1999) analyses attribute the failure of self-speech to influence the child's overt behavior to neurological deficits. These accounts suggest that it is somewhat of a surprise, and a problem, that self-stated verbal behavior does not influence pertinent nonverbal behavior. However, the distinction between "knowing that," verbally stating facts or rules, and "knowing how," behaving in accordance with those facts or rules, is important for a meaningful analysis. This is a distinction familiar to behavior analysts (Hineline, 1983; Hineline & Wanchisen, 1989; Reese, 1989). Next, research is explored that may explain why interventions that emphasize self-directed speech have

met with little success. Behavior analysis focuses less on deficits in the child and more on the function of hyperactivity and environmental context.

*A Behavior Analysis of the
Role of Self-Rules in
Compliance*

Direct observation studies of hyperactivity suggest two reasons why effective self-directed speech might not be typical in children with such behavior. First, compared with other same-age children, children with hyperactivity have far higher rates of motor behavior and vocal behavior (see Barkley, 1998b, for a review). Motor behavior includes ankle movement, wrist activity, arm and leg movements, movement of the buttocks and lower torso (i.e., squirming), and locomotion. Vocal behavior includes humming, unusual noises, speech that often is unrelated to current tasks, with strong volume. The high-rate behavior is resistant to extinction and is maintained in the context of aversive social consequences presented by peers and adults that usually have a punishing effect on the child's behavior. The behavior continues when the child is alone, in the absence of external positive reinforcement or escape or avoidance conditions, and even during sleep. Hyperactivity has been described as "generally unnecessary" and "often irrelevant to the task or situation" (Barkley, 1998b, p. 60). Hyperactivity does not result in observable consequences that alter the strength of the behavior. The high-rate hyperactive responses are, however, functional because they seem to be automatically strengthened by internal sensory positive reinforcement (see Martin & Pear, 1999, p. 262).

This hyperactivity is of interest because such intense prepotent motor behavior may be incompatible with concurrent self-directed or private speech. This is because the child emits unusually high rates of fine and gross motor movement and high-rate vocal behav-

ior that is irrelevant to the task. It seems unlikely that the child could concurrently emit self-directed speech that has enough stimulus control to overshadow the strength of the prepotent hyperactive motor behavior.

The logic that this analysis is based on is consistent with a methodological control used in human operant research designed to evaluate functional relations among private events and observable motor behavior (Hayes, Zettle, & Rosenfarb, 1989; Taylor & O'Reilly, 1997). That research cited data illustrating that human responding under fixed-interval (FI) schedules of reinforcement shows patterns distinct from typical nonverbal organisms. It was proposed that when participants were asked to repeat nonsense syllables during experimental trials, the evocative stimulus functions of human self-rules would be blocked by the nonsense verbalizations. Then, FI schedule-induced behavior would resemble that of nonverbal organisms. This provided one source of evidence that verbal self-rules might have influenced behavior under FI schedules before the interfering nonsense syllables were introduced. The difference between children with noncompliant and hyperactive behavior and the human operant research referred to above is that children with ADHD emit their own nonsensical task-irrelevant behavior that may block self-rules.

A second reason why effective self-directed speech might not be typical in children with hyperactivity is that their verbal environment seems less likely to provide the context to condition self-directed speech. Evidence for this is found in direct observations of parent-child interactions showing that a child's hyperactivity may be aversive to adults in whose presence such behavior frequently occurs (see Danforth et al., 1991, for a review). For example, in the verbal interactions of parents, repeated commands, verbal reprimands, and correction are commonly directed at their children with hyperactivity. However, when these children

are well behaved, their parents give fewer rewards for compliance, initiate fewer verbal interactions, and attend less to appropriate behavior and vocalizations initiated by the child. Children with hyperactivity often have family environments that are different than the environment of typical children, and even from their own monozygotic twins who are less active (Danforth, 1999). Parent behavior may be, in part, an outcome of their child's disruptive, intrusive repertoire. The aversive properties of the hyperactivity may generalize to the child him- or herself, in that parents tend to avoid children with ADHD when they behave well. The same parents are unlikely to behave in such a manner with children who do not exhibit hyperactivity or when children are prescribed medication that attenuates hyperactivity. Such parent-child interaction patterns are found in preschool ages, middle childhood ages, and into adolescence, and appear to be stable over development with families that have children with hyperactivity.

These direct observation data suggest that when the child is well behaved and perhaps prone to attend, his or her verbal community is less likely to question past, present, or future behavior, or the variables and contingencies of which their behavior is a function. The verbal community of children with hyperactivity is far more likely to engage them when they are particularly overactive and disruptive, but the children do not seem prone to attend when overactive (i.e., when the child is most active, it is not a good teaching moment). Furthermore, the form of the interaction when the child is disruptive is more likely to be harsh discipline rather than constructive teaching or directed questioning. As such, the verbal community is less likely to condition self-directed speech and self-directed questions. These two behavior analyses suggest that the verbal community may not condition self-directed speech, or it may not be effective even when it is conditioned because of the strength of the other potent behavior. There-

fore, consistent with a behavior analysis, interventions to increase compliant behavior should not rely on self-speech or hypothesized mediational verbal events.

Behavioral Treatment to Alter the Function of Parent Commands

In light of this, a child-directed training program (i.e., an intervention in which the therapist works directly with the child) was incorporated into a parent-training program for families of children with ADHD and ODD. The goal was to increase the rate of compliance. Events were arranged so that the target child with ADHD and ODD observed role-plays of parents giving a command and a child either complying or not. The target child verbalized rules about the form of parent commands to which compliance is required and predicted consequences his own parent would provide for compliance and noncompliance. The program was conceptualized as an effort to evoke a vocal description of rules and simultaneously provide opportunities for observational learning that alter the stimulus control function of future parent directives. In this analysis, *function altering* means that the intervention was designed to alter the behavioral function of parent commands (Schlinger, 1990, 1993; Schlinger & Blakely, 1987). Schlinger (1993) reviewed research that suggests important aspects to include when using rules to alter the function of prescribed stimuli such as parent commands. The preliminary study described here incorporates these characteristics. First, children should verbalize the relevant rules and not act solely as the listener. Second, younger children might benefit most when the relation between the antecedent, the response, and the consequences is explicitly identified. Third, rules described by the child should accurately correspond to the contingency. Finally, the addition of observational learning, or modeling, might enhance the impact of the training. There was no effort to

teach self-rules or rules that the child would generate later.

Ongoing efforts to develop programs to help increase the rate of compliance in children with ADHD are warranted because parent-training outcome data show that in spite of behavior management interventions, children with hyperactivity remain at risk for clinically significant oppositional and disruptive behavior (Danforth et al., 1991; Pisterman et al., 1989, 1992). It remains to be demonstrated that parent-training programs for families of children with ADHD and ODD are sufficient to modify parent and child behavior (see Graziano & Diament, 1992, for a review). Furthermore, parent training is time consuming, and it is important to acknowledge that behavior management procedures are deceptively complicated and difficult for parents to perform (Sajwaj & Dillon, 1977). Any work that could be done directly with the child to facilitate improved rates of compliance is welcome. A preliminary study describes a child-focused training program conducted in conjunction with parent training.

METHOD

Criteria for participation, the dependent measures, and the parent-training procedures were identical to previous parent-training research with children with ADHD and ODD (Danforth, 1998b, 1999). The child-training intervention is new.

Participants

The participants were 3 mother-son dyads referred from pediatricians who had diagnosed the boys with ADHD and were concerned about their disruptive behavior at home. Screening information was obtained through a parent interview based on one designed specifically for use with ADHD populations (Barkley, 1990, pp. 261-277). Subject 1 was 5 years 9 months of age, and Subjects 2 and 3 were 6 years 4 months of age. Each boy met the criteria for ODD and ADHD (American

Psychiatric Association, 1994) and had no other disorders. Each boy also met diagnostic research criteria for ADHD (Barkley, 1988). T scores on the Conners' Parent Rating Scale-Revised (CPRS-R; Conners, 1990) hyperactivity index were 92, 72, and 70, respectively, for Subjects 1, 2, and 3. T scores from the CPRS-R conduct problems factor and the Home Situations Questionnaire (HSQ; Breen & Altepeter, 1991) pervasiveness scale were more than two standard deviations above the mean. T scores from the severity scale of the HSQ and the externalizing scale of the Child Behavior Checklist (CBCL; Achenbach, 1991) were all 1.5 standard deviations above the mean. Mothers had a mean age of 34, a mean educational level of 15 years, and were paid a \$75 stipend.

Measures

Three types of outcome measures were used: (a) direct observation, (b) telephone interviews, and (c) standardized rating scales.

Direct observation. Direct observations of mother-child interactions were conducted for 15 min during each baseline session and after Training Sessions 2, 4, 6, 8, and 10. Direct observations were conducted in a playroom (5.5 m by 4 m) in a childcare center. The playroom had an unobtrusive ceiling-mounted camera and microphones that transmitted to an adjacent room where the interactions were videotaped for later coding. In the playroom were a small desk, chairs, and shelves that held toys and books. Some toys were arranged on the floor. Each mother was alone with her son during the observations. The mother's task was to get her son to follow directions by doing whatever she would usually do at home. Each observation had two conditions: a 5-min worksheet condition and a 10-min instructions condition. During the worksheet condition, the boy was to sit at his desk and independently complete premath and math problems. During the instructions con-

Table 1

Definitions.

Behavior	Abbreviated definition
Parent Antecedent Behaviors	
Command:	Direct orders that specified the child behavior. Presented in the imperative structure, not as questions.
Question command:	Commands presented as questions in the interrogative structure.
Vague command:	Commands that did not specify the child behavior to be initiated or inhibited.
Warning:	Commands phrased as "if-then" statements in which a consequent event is aversive (e.g., "If you do not put the book on the shelf, you will have to go to the corner").
Praise:	Positive evaluation, approval, physical affection.
Reprimand:	Disapproval, admonishment, physical animosity (from Mash & Barkley, 1986; Mash, Terdal, & Anderson, 1973).
Child Behaviors	
Compliance:	Initiation of compliance within 5 s of the termination of a parental command, question command, or warning.
Noncompliance:	Failure to initiate compliance or maintain inhibition of a prohibited response.
No opportunity to comply:	Noncompliance following vague commands, or when two commands were presented within 5 s of one another before the child had a chance to comply with the first command.
Parent Consequent Behaviors	
Praise:	Within 5 s of the initiation of compliance.
Reprimands:	Within 5 s of noncompliance.
Time-out:	Directing the child to the corner of the room after noncompliance.

Note. Adapted from Forehand and McMahon's behavioral coding system (1981, pp. 183–218).

dition, the boy was to pick up toys on the floor and put them away.

The interaction code was based on a system adapted from Forehand and McMahon's behavioral coding system (1981, pp. 183–218). Table 1 lists the abbreviated definitions of the dependent measures that were coded as they occurred in an antecedent-behavior-consequence sequence. Parent behavior was coded first. Child compliance was coded second. Parent consequences were coded last. Three undergraduate psychology students independently

coded the videotaped interactions. Interobserver reliability was collected during 52% of the observations and was calculated by computing the percentage of agreements for each occurrence of the dependent variable out of the total number of agreements plus disagreements for occurrence. Reliability for the dependent measures was as follows: commands, 89%; question commands, 91%; vague commands, 87%; warnings, 86%; praise, 87%; reprimand, 83%; compliance, 89%; non-compliance, 87%; time-out, 99%.

Telephone interviews. The Parent Daily Report (PDR; Chamberlain & Reid, 1987) checklist of child problem behaviors served as a parent observation instrument that provided a measure of disruptive behavior in the home. Throughout baseline and treatment, telephone interviews were conducted three times per week with the mother who reported if any of 34 child problem behaviors listed in the checklist had occurred in the previous 24 hr. Six telephone calls over a 2-week period are sufficient to establish a stable estimate of the rate of problem behavior (Chamberlain & Reid).

Behavior rating scales. To assess disruptive child behavior, each mother completed the conduct problems subscale from the CPRS-R. Satisfactory reliability and validity data are available in Connors (1990). To assess the severity and pervasiveness of noncompliance across settings, mothers also completed the HSQ. Each mother rated her son's defiant behavior across 16 different home and public settings. Satisfactory reliability and validity data were reported by Breen and Altepeter (1991). Both of these scales were administered during each baseline and treatment week. To assess conduct-disordered behavior such as fighting, temper tantrums, and disobedience, each mother completed the broad-band externalizing scale from the CBCL during baseline and after the final treatment session. Satisfactory normative data are presented in Achenbach (1991). To assess dimensions of parent behavior, mothers completed the self-report parenting scale (Arnold, O'Leary, Wolff, & Acker, 1993) during baseline and after the final treatment session. The parenting scale total score evaluates three aspects of undesirable parenting behavior: laxness, overreactivity, and verbosity. Satisfactory normative data specific to parents of children with ADHD can be found in Harvey, Danforth, Ulaszek, and Eberhardt (2001).

Procedure

A multiple baseline design across children with baseline, training, and follow-up conditions was used. During each baseline session, rating scales were completed and a 15-min direct observation of mother-son interactions was conducted.

Parent training. Ten individual weekly 1-hr parent-training sessions followed baseline. Parent training adhered to parameters described in detail by Danforth (1998a) and is referred to as the Behavior Management Flow Chart (BMFC). The BMFC was designed to address child noncompliance with parent directives. The BMFC was fashioned following a review of child behavior-management research. Then, a task analysis of the research was conducted. The BMFC (Figure 1) is a flowchart, based on the task analysis, of child behavior-management steps taught to adults. Table 2 presents the topics and schedule for the parent-training sessions. Supplemental written materials corresponding to each step of the BMFC were presented to the mothers to read during and after training sessions.¹ First, a theoretical framework, based on a previous analysis of interactions between parents and their hyperactive children (Danforth et al., 1991) was presented to the mother. Modeling and role-playing with feedback were the teaching techniques. Parenting skills were taught in a forward-chaining fashion (Martin & Pear, 1999, p. 135), in the same order that they are presented in the flowchart and consistent with how the mother was to utilize the strategies in the context of misbehavior. That is, the first response emitted by the mother when she wanted to direct her son was a command, and this was the first skill taught; the

¹ A complete copy of the supplemental parent-training materials that correspond to each session and step of the BMFC is available from the author. These are the same written materials presented in the original program description (Danforth, 1998a) and evaluated in previous research (Danforth, 1998b, 1999).

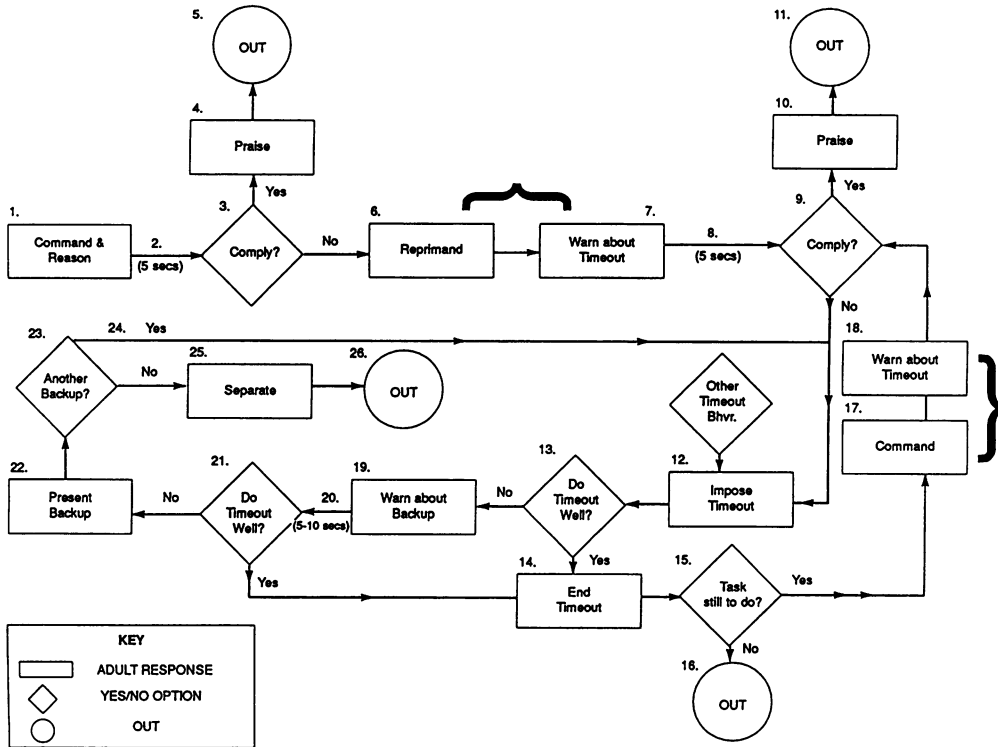


Fig. 1. The Behavior Management Flow Chart is a flowchart of steps taught to parents. Rectangles indicate an adult response, diamonds indicate a yes–no option, and circles indicate that the interaction is over. Brackets indicate that two adult responses are presented simultaneously.

second response was to quietly wait 5 s, and this was the second skill taught, and so on. During training, the BMFC served as the basis for discussion and as a guide to parenting in the home and community. Danforth (1998a, 2001) details the differences between the BMFC and other behavioral parent-training programs.

Child training. Seven 15- to 30-min child-training sessions were added to the parent-training sessions. The purpose was to train each boy to vocally discriminate the form of commands his mother produced and to tact the consequences his mother presented for compliance, noncompliance, and adhering to the time-out regimen. Based on the parameters of the BMFC, 88 mother–child role-play scenarios were created. Table 2 presents the topics and schedule for the child-training sessions. Sample role-play scenarios that include both compliance and noncom-

pliance are presented in Table 3.² All child training took place after the mother had been trained in that BMFC step and had been utilizing that parenting strategy in the home for at least 1 week. Therefore, as indicated in Table 2, child training began in the 3rd week of the intervention. This ensured that the boy was taught to describe his mother's behavior in the training session that was reasonably consistent with mother's behavior at home. At the onset of each child-training session, the relevant parenting strategies were stated to each boy and the role-plays that are described below followed. The boys were not told that their mothers were participating in the parent-training program.

Discriminating antecedent commands. At Session 3, each boy was

² A complete copy of the 88 parent–child role-play scenarios is available from the author.

Table 2

The topics and schedule for parent and child training.

Ses- sion	BMFC step	Parent training topic	Child training topic
1		Didactic instruction on learning principles, ODD, ADHD, and coercion.	None
2	1	Commands	None
3	2–6	Wait 5 s after command. Praise. Reprimands.	Discriminate commands in the imperative from interrogative commands and mands for favors.
4		How to conduct home reviews of child training steps.	Consequences of praise for compliance and reprimand for noncompliance.
5	7–26	Warning for time-out. Time-out. Back-up for time-out refusal. Separation.	Review Sessions 3 and 4.
6	7–26	Same as Session 5. Also, review time-out location, target behaviors and back-up.	Review Sessions 3 and 4.
7	1–26	Review specific difficulties and rehearse all BMFC steps.	Consequence of warning that they would have to go to time-out if noncompliant.
8	Same	Same as above.	Consequence of time-out if non-compliant with the warning.
9	Same	Same as above.	Consequence of warning about back-up consequence if they refuse to go to time-out.
10	Same	Review of learning principles, ODD, ADHD, and coercion. Rehearse all BMFC steps.	None

Note. BMFC steps correspond to the steps in Figure 1. For details on parent training assignments, see Danforth (1998a, 1998b, 1999).

taught to distinguish commands from questions and favors. This corresponded to mother behavior in Step 1 of the BMFC (Danforth, 1998). The goal of this phase was for the boy to discriminate the imperative commands he was required to follow from the interrogative commands and mands for favors to which he had an option to comply. The mother stated a command (see sample role-plays in Table 3) and then the therapist asked the boy, "Do you have to do that, or is that something you don't have to do if you don't want to?" If the boy was correct, he was vo-

cally praised in conjunction with a high-five handshake. If he was incorrect, the boy was told the correct answer and his mother repeated the same command.

Praise and reprimand consequences. Role-plays were conducted in front of each boy to teach him about consequences. Mother played herself. Father (when available) or a male undergraduate assistant acted the role of the boy. The role-play scenarios were stopped at designated critical junctures (see Table 3). At that point, the boy was asked to predict the mother's next

Table 3

Sample role-play scenarios.

Child Training Session 3, Review Sessions 5 and 6

1. Mother: Say, "[name of child] do you want to pick up the cowboys and Indians?"
2. Mother: Say, "[name of child] put the soccer ball in the box."

Child Training Session 4, Review Sessions 5 and 6

1. Mother: Say, "[name] put the soccer ball in the box."
- "Child": Does as told.

Stop/wait—Child predicts outcome.

- Mother: Say, "Good job putting the ball in the box."
2. "Child": Tosses the yellow ball up and down in the air.
- Mother: Say "[name] don't do that, stop throwing the ball in the house."
- "Child": Continues to toss the ball.

Stop/wait—Child predicts outcome.

Mother: Firmly say, "You are not following directions."

Child Training Session 7

1. Mother: Get a piece of paper and crumple it up. Then, say, "[name] please throw this away in that basket over there" (point to the basket).
- "Child": Does as told.

Stop/wait—Child predicts outcome.

- Mother: "That's great, you're helping me out."
2. Mother: Say, "[name] please put on your coat."
- "Child": Starts to play with any toy that is on the floor.

Stop/wait—Child predicts outcome.

Mother: Say, "[name], you are not doing as you were told, I said to put on your coat, I'm warning you, if you don't put that coat on you will go to [name of time-out location]."

Child Training Session 8

1. Mother: Say, "[name] bring me a magazine" (point to the magazine).
- "Child": Does not bring magazine.
- Mother: Say, "If you don't bring me the magazine, you will have to go to [name of time-out location]."
- "Child": Brings the magazine.

Stop/wait—Child predicts outcome.

- Mother: Say, "Good job bringing me a magazine."
2. Mother: Say, "[name] please get some tissue from the shelf over there [point] to take to school."
- "Child": Opens a book to read.
- Mother: Say, "Either get some tissue or go to [time-out location]."
- "Child": Keeps reading the book.

Stop/wait—Child predicts outcome.

Mother: Angrily say, "Go to the [time-out location] now!"

Child Training Session 9

1. Mother: Say, "Bring me a magazine please" [point to the magazine].
 - "Child": Stays where he is.
 - Mother: Say, "[name] you are not following directions, if you don't bring me a magazine you will have to go to your room."
-

Table 3

Continued.

	"Child": Stays where he is.
	Mother: Say, "OK [name] you are not listening, go to your room" [point to the hallway].
	"Child": Stays where he is.
	Stop/wait—Child predicts outcome.
	Mother: Say, "[name] this is a warning, if you don't go to your room you cannot go outside and play for the rest of the day."
2.	"Child": Turns on the TV, or plays around with the knobs and dials on the TV.
	Mother: Say, "[name], the TV is broken, please don't touch the TV until we get it fixed."
	"Child": Keeps playing with the TV.
	Mother: Say, "[name], if you don't get your hands off the TV, then you will have to sit in that green chair" [point].
	"Child": Keeps playing with the TV.
	Mother: Say, "[name], because you kept on playing with the TV when I told you to stop, you have to go sit in that chair" [point to the green chair].
	"Child": Sits in the green chair as instructed.
	Stop/wait—Child predicts outcome.
	Mother: Ignores, does not look at the other person, and says nothing.

response (i.e., the child actor's consequence). Then, the scenario concluded. If the boy correctly predicted his mother's response, he was praised. If the boy made an incorrect prediction, the mother's response was described to the boy, and the role-play was repeated once so he could observe his mother's response.

In Session 4, each boy was taught the consequences of compliance or noncompliance following a parent command. This training corresponded to Steps 4 and 6 of the BMFC. The goal was for the boy to vocalize that he would be praised if he complied (Step 4) and he would be reprimanded if he did not comply (Step 6). First, the boy was told, "After your mother tells you to do something, if you follow directions she will tell you that you did a good job," and "if you don't do what your mom said she will tell you that you didn't follow directions and maybe she will feel angry." Then the role-plays were performed. Mother presented a command (see Table 3) and the

child character either complied or did not comply as the script dictated. Then, the role-play stopped and the therapist asked the boy, "What is your mom going to do next?" After the boy replied, the role-play finished with mother providing the appropriate consequence. If the boy had correctly predicted his mother's behavior, he was praised. If the boy did not accurately predict what his mother was going to do, then the mother's behavior was described to the boy and the role-play was repeated for his benefit.

Review. Sessions 5 and 6 reviewed and repeated (with new scenarios) the previous two sessions.

Time-out warning. At Session 7, each boy was taught that he would also receive a warning that he would have to go to time-out if he did not follow directions. (This is Step 7 of the BMFC.) The boy was to vocalize that he would be praised if he complied with mother commands, but if he did not comply he would be reprimanded and would be given a warning about a

potential time-out. In addition to what the boy was told in the previous steps, he was also told, "After your mom tells you to do something, if you don't follow directions she will warn you that if you don't do what you were told you will have to go to time-out." Rather than using the word "time-out," we identified the time-out setting at home (e.g., the stairs or the boy's bedroom). Then the role-plays were performed. Mother presented a command (Table 3) and the child actor either complied or did not comply as the script dictated. Then the role-play was stopped and the therapist asked the boy, "What is your mom going to do next?" The boy replied and the role-play continued. Consequences consistent with those described in previous phases followed the boy's answer.

Time-out and consequences for time-out refusal. Training continued in a similar fashion. The goal of Session 8 (Table 3) was for each boy to predict that he would be praised if he complied with maternal commands after the time-out warning, but if he continued to disobey after the warning his behavior would produce a time-out. (This is indicated in Step 12 of the BMFC.) During Session 9 (Table 3) the goal was for each boy to predict that if he did not go to time-out, he would receive a warning about back-up disciplinary consequences for time-out refusal. (Step 19 of the BMFC delineates this procedure.)

Subjects 1, 2, and 3 responded correctly to 91%, 97%, and 95% of the role-play queries, respectively. The primary therapist and an undergraduate assistant independently coded whether or not each boy answered correctly. Interobserver reliability for correct responses was 99%.

Home review. Following child-training Sessions 4, 5, 7, 8, and 9, mothers conducted one to three home reviews of the training program per day. The goal was for the boy to vocalize the consequences of his behavior. The reviews were conducted immediately after the mother had presented a com-

mand and the consequence that adhered to the BMFC procedures. The mother asked her son to describe what she had just done following her son's behavior: praise, reprimand, warning of time-out, sent the boy to time-out, or warning of a back-up consequence. Praise was contingent on correct description of the mother's response. The mother was given outlines of the dialogues she was to have with her son at home, and she completed logs describing the outcome of each scripted interaction.³

Follow-up. A follow-up assessment was conducted 6 months after training ended. Direct observation of a mother-son interaction was conducted, and the CPRS-R, the HSQ, and the parenting scale were administered. In addition, eight role-play probes were conducted. The probes evaluated whether the boys were able to discriminate the form of commands and predict consequences in the absence of therapist feedback that had included contingent praise in the training sessions. Subjects 1, 2, and 3 responded correctly to eight, seven, and seven of the role-play probes, respectively.

RESULTS

Direct Observation

Figure 2 depicts the percentage of parent commands to which each boy complied, hereafter referred to as the compliance ratio. A compliance ratio below 60% was considered clinically deviant (Forehand, 1977). During baseline, compliance ratios remained consistently low. As training was sequentially introduced, compliance ratios gradually increased. The mean compliance ratio across the boys was 23.7% during baseline, 63.3% at the fourth training observation, 67.0% at the fifth training observation, and 63.0% at follow-up.

Table 4 presents individual-mother

³ The homework dialogues used by mothers and the logs for reporting the outcome of each review are available from the author.

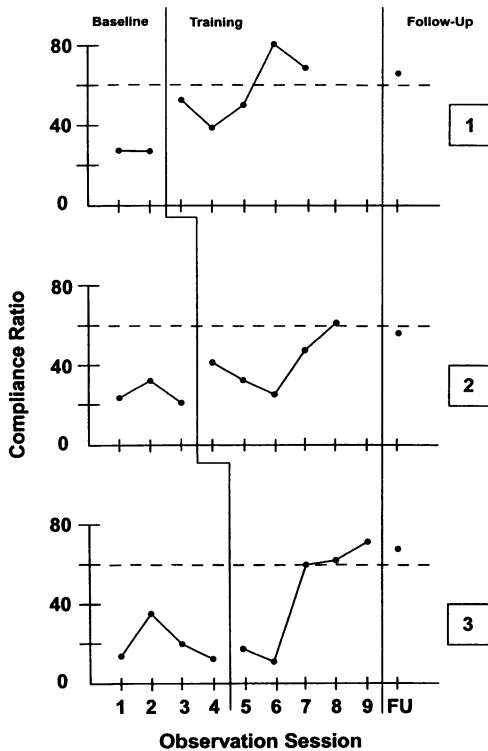


Fig. 2. The percentage of mother's commands to which each boy complied, called the *compliance ratio*. The dashed horizontal indicates a compliance ratio below 60%, in the clinically deviant range.

data indicating that after relevant training (a) the percentage of maternal commands presented in the correct form increased, (b) the percentage of commands that were emitted too fast, defined as within 5 s of one another before the child had an opportunity to comply, decreased, (c) the percentage of child compliant responses followed by mother praise increased, and (d) the rate of maternal contingent reprimands increased. During the observations before training time-out warnings and the time-out procedure, Mothers 1 and 2 presented no warnings, whereas Mother 3 presented six warnings. Subject 3 complied with two of those warnings. Before time-out training, no time-outs were presented to any of the boys. After training, the delivery of warnings by mothers followed 39% of child non-compliance. The boys complied with

35% of those warnings, and when they did not comply they were sent to time-out 45% of the time. During observations at follow-up, parent warning followed 24% of child non-compliance. The boys complied with 50% of those warnings, and when they did not comply they were sent to time-out 66% of the time.

Telephone Interviews

Table 5 lists the average sum of the total scores from the PDR telephone interviews conducted during baseline and each training week. Individual PDR scores began to drop after 5 to 7 weeks of training and were generally lowest the last 2 weeks of training. PDR scores for Subjects 1 and 3 improved by approximately 50%, and scores for Subject 2 improved by approximately 25%.

Rating Scales

Table 5 lists the average T scores from the CPRS-R conduct problems factor and from the HSQ number of problem settings score and the mean severity score during prescreening assessment, each baseline and training week, and follow-up. The T scores are standard scores with a mean of 50 and a standard deviation of 10. CPRS-R conduct problem scores varied for the 3 boys. Subject 1 showed consistent decreases after Training Week 8. Although Subject 2 showed an overall decrease, the change was never consistent (e.g., Training Week 9). Subject 3 had scores ranging from 59 to 63 until Week 6, when scores began a strong and consistent decrease.

T scores for the HSQ number of problem settings also varied across boys. Scores for Subject 1 dropped and remained low after only 2 weeks of training. With the exception of the second baseline session, T scores for Subject 2 reflected that his mother always rated him as problematic in each of the 16 situations listed on the HSQ. T scores for Subject 3 ranged from 71 to 83 until Week 7, when scores began to

Table 4

Child	B1	B2	B3	B4	B5	OS1	OS2	OS3	OS4	OS5	FU
Percentage of maternal commands presented in the correct form											
1	70	63				84	89	96	95	92	91
2	52	67	66			95	96	100	95	100	94
3	58	58	65	56		98	93	90	92	86	76
Percentage of maternal commands emitted too fast											
1	46	29				9	25	12	0	6	13
2	28	38	34			32	20	35	0	0	6
3	67	40	58	59		48	37	15	15	7	19
Percentage of child compliant responses followed by mother praise											
1	9	0	6			57	69	53	44		38
2	0	13	0	6		47	40	22	18		20
3	33	14	0	0	0	67	50	56	90		46
Percentage of child noncompliant responses followed by mother reprimand											
1	0	0	0			7	23	0	11		14
2	0	0	0	0		32	0	10	17		14
3	8	0	0	0	0	43	0	33	33		25

Note. B = baseline; OS = observation session, FU = follow-up.

Table 5

Child	Pre	B1	B2	B3	B4	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	FU
Sum of the total scores from the Parent Daily Report ^a																
1		39	23			20	14	24	24	26	18	13	13	12	14	
2		58	68	61		66	64	64	58	67	56	42	51	50	42	
3		43	55	28	46	26	29	43	43	19	18	22	19	17	22	
T scores from the CPRS-R conduct problems factor ^b																
1	100	84	75			75	72	65	65	72	75	75	65	62	59	62
2	72	78	78	78		78	78	72	72	72	69	72	66	72	69	66
3	72	66	66	66	66	66	63	59	63	63	41	44	47	44	44	53
T scores for number of problem settings from the HSQ ^b																
1	78	71	71			64	53	57	53	53	53	46	50	50	46	53
2	86	80	86	86		86	86	86	86	86	86	86	86	86	86	86
3	77	83	77	83	80	83	83	80	74	71	74	65	59	59	50	59
T scores for mean severity score from the HSQ ^b																
1	85	78	82			68	79	78	72	77	74	79	70	61	59	78
2	65	61	69	65		66	68	68	63	62	67	61	64	63	57	59
3	67	72	70	65	70	70	63	61	66	50	52	55	45	49	52	51

Note. CPRS-R = Conner's Parent Rating Scale—Revised, HSQ = Home Situations Questionnaire, Pre = pretreatment screening, B = baseline, T = training, FU = follow-up.

^a The 34-item PDR was administered three times per week for a maximum score of 102 per week.

^b The T scores from the CPRS and the HSQ are standard scores with a mean of 50 and a standard deviation of 10.

Table 6

T scores for rating scales administered during baseline, posttraining, and follow-up.

	BL	Post	Follow-up
CBCL externalizing scale			
Child 1	68	60	
Child 2	75	68	
Child 3	65	59	
Parenting scale total score			
Child 1	78	50	53
Child 2	80	53	49
Child 3	46	33	39

Note. BL = baseline, CBCL = Child Behavior Checklist.

The T scores are standard scores with a mean of 50 and a standard deviation of 10.

drop consistently. Subjects 1 and 2 had high and stable HSQ mean severity T scores until near the end of training, whereas scores for Subject 3 began a strong and consistent decline after only 1 week of training.

Table 6 indicates changes in the rating scale T scores comparing baseline with posttraining and follow-up. Scores from the CBCL externalizing index decreased moderately after training. There was substantial improvement in the parenting scale total score for self-reported parenting behavior. These improvements were maintained at follow-up.

Clinical Significance

Analysis of clinical significance data evaluates the degree to which the training brought the mothers' and sons' behavior within the nonclinical range of functioning. As stated previously, a compliance ratio below 60% was considered clinically deviant (Forehand, 1977). Figure 2 indicates that at the end of training, all 3 boys had compliance ratios above the clinically significant range, and these were maintained for 2 of the boys at follow-up. Pister-

man et al. (1989) established an alternative measure of clinical improvement as a minimum compliance ratio increase of 50% from pretreatment to posttreatment. Based on these criteria, all 3 boys demonstrated clinical improvement from baseline to the end of treatment and follow-up.

For the rating scales a cutoff score of two standard deviations above the mean (i.e., a T score above 70) indicated clinical significance. All CPRS-R conduct problems scores (Table 5) were clinically significant at prescreening. Scores for Subjects 1 and 2 were consistently below clinical significance after Training Session 8, and they remained so at follow-up. Scores for Subject 3 were not clinically significant during baseline (although they met diagnostic research criteria at more than 1.5 standard deviations above the mean; see Barkley, 1988), and they were well within the normal range after training and at follow-up.

Data from the HSQ suggested that the number of problem settings for noncompliance remained clinically significant for Subject 2 throughout treatment and follow-up. The pervasiveness score for Subject 1 entered an acceptable range early in treatment, and the pervasiveness score for Subject 3 was consistently below clinical significance beginning at Training Session 7. Mean severity scores for noncompliance from the HSQ showed different patterns for all 3 boys. The scores for Subject 1 were not normal until Training Session 9, and this gain was not maintained at follow-up. Scores for Subject 2 were never clinically significant by this measure, so improvement was only modest. Scores for Subject 3 were often clinically significant until Treatment Session 2, after which his scores were never clinically significant.

DISCUSSION

A child-directed training component was added to BMFC parent training for families of boys with ADHD and ODD. Multimodal outcome measures

illustrate that the intervention increased the boys' compliance and improved parenting skills. The boys accurately responded to the child-training queries regarding the form of maternal commands and the consequences for compliance. Mothers' ratings of child misconduct and direct observations at the 6-month follow-up were relatively stable, as was the boys' ability to respond accurately to the child-training queries.

Some of the success of the current program may have been due to variables that were unique to the structure of the child-directed component. The intervention required each boy to discriminate verbally the form of commands with which he had to comply, as well as specific consequences presented by his mother for the behaviors of compliance and noncompliance. Thus, each boy was required to identify three integral components of relevant, important, and complex contingency-specifying stimuli. The therapist presented differential consequences to each boy for accurate descriptions of antecedents and consequences, but the therapist never presented differential consequences for compliance. The rules each boy described accurately corresponded to the contingencies presented by his mother, and observational learning was incorporated into the training.

To the extent that the new parenting behavior involved consequences that conditioned improved compliance to commands, the parent training might be said to have trained compliance that is evoked by parent commands because of compliance that has been more successful in the presence than in the absence of those commands. Such compliance requires a history of reinforcement in the context of parent commands and is most accurately identified as contingency-shaped behavior. However, the child training might have altered the function of subsequent maternal commands. To the extent that the child-directed training potentiates improved compliance by altering the

function of parent commands, such compliance might illustrate rule-governed behavior. This is consistent with the functional unit of rule-governed behavior termed *tracking*, rule-governed behavior under the control of the correspondence between the rule and the actual contingencies (Zettle & Hayes, 1982).

Unfortunately, as noted by Schlinger (1993, p. 12), it is difficult to distinguish the discriminative from the function-altering properties of verbal stimuli, as is demonstrated in this case. After the intervention, it was not possible to determine whether the subsequent increase in compliance was a result of a recent history of (a) parenting behavior that conditioned compliance and altered the function of parent commands, or (b) the child-training program designed to alter the function of parent commands by teaching children to vocalize rules in the context of observational learning. The control that commands gained over the boys' behavior may have been a result of both parenting consequences and the child training, and there could have been a synergistic interaction between the two (see Shull & Fuqua, 1993). However, previous research separating the evocative affects of verbal stimuli from their function-altering effects shows that the evocative function of verbal stimuli is very important in the development of compliance by young boys (Mistr & Glenn, 1992), especially non-compliant boys (Hupp & Reitman, 1999; Reitman & Gross, 1996). Thus, BMFC parent training was the primary therapy, and child training was the adjunct intervention within this component of treatment. It seems highly unlikely that the child training would have had any impact without the parent training, because baseline parenting data indicate that the rules described by the boys would rarely have corresponded to actual mother commands or consequences.

Generalization to the home setting may have been facilitated by parent behavior in that setting as well as the

child-directed homework assignments. Future research could evaluate such generalization by having children observe other adults (teachers, other parents) issue the same commands and determine whether the children could accurately tact those statements. There is no evidence to support the assumption that the boys used self-speech to mediate their own behavior, and there are serious methodological complications with such an analysis (Chase & Danforth, 1991, p. 210). Furthermore, the child training was not designed to teach self-speech that generalized to many situations.

Several additional limitations qualify the conclusions that have been drawn. Treatment fidelity was not independently verified, so it is not possible to ensure that the treatment was conducted as described. However, a detailed description of the BMFC treatment and the child-directed training are available, and such issues should be examined in replication studies. Descriptive case studies such as this commonly have imperfect experimental control. The observations were conducted in an analogue setting rather than at home. Finally, a limited number of observations at follow-up preclude an understanding of generalization over time.

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